THIRD GRADE MATHEMATICS

GRADE LEVEL CONTENT EXPECTATIONS

3 MATH

v.4.04

NUMBER & OPERATIONS

ALGEBRA

MEASUREMENT

GEOMETRY

DATA & PROBABILITY

Welcome to a preview of Michigan's mathematical future! This document not only introduces Michigan's new Grade Level Content Expectations for mathematics, it also establishes high expectations in mathematics to better prepare all K-12 Michigan students for the challenges of the future.

Creating grade-level expectations involves a complex combination of understanding of mathematics, curriculum, student learning, teaching, current practices, and policy. Curriculum directors, mathematics educators, and classroom teachers from Michigan school districts across the state, together with mathematics and mathematics education faculty from universities across the state, have been involved in the development and/or review of the **Michigan Mathematics Grade Level Content Expectations.** The GLCE are intended to be usable as a framework for the development of grade-by-grade assessments, and to provide teachers with a guide for their instructional and curricular emphases in classrooms. The expectations were constructed to feature continuity from one grade to the next, and to ensure coherence both mathematically and pedagogically. These expectations represent a challenge toward which to aspire; in some cases, teachers and mathematics educators will be called on to move beyond their current practice and experience into territory that will be both demanding and rewarding. Michigan students can rise to the challenge of high academic standards. This document provides a set of ambitious goals for all of us.

This document is intended to be an assessment tool. This means students will be expected to be proficient in the concepts and skills included in this document at the end of the indicated grade level. These expectations are written to convey intended performances by students. The expectations here generally represent key landmarks in mathematics learning — areas where students are expected to have consolidated their understandings and skills. Thus it does not attempt to elaborate all of the precursor ideas and concepts that lead to a particular expectation in a particular grade level — it instead assumes that teachers will build up to the expectations through exploration and development of concepts and processes

The Grade Level Content Expectations are not designed to be a curriculum document, or to function as a scope and sequence framework. It is not designed to suggest the various pedagogical options and strategies that might best enable students to attain these expectations. Rather, it should serve as a basis for the development of a curriculum and instructional strategies that would help the students attain the concepts and skills necessary to meet the GLCE. Various groups are being organized

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to develop clarification documents, content examples, more elaborated explanations, and suggestions for professional development that would support these expectations. Ultimately, teachers, school personnel and district leaders will need to collaborate and draw on their own professional wisdom and experience, as well as on research, to decide how best to organize instruction to help their students meet these expectations.

The mathematics content expectations have been organized into five strands: Number and Operations, Algebra, Geometry, Measurement, and Data and Probability.

These expectations are being presented in two formats; one designed to show specific grade level expectations and a second to show how the expectations transition from one grade level to the next. In the **grade level** format the expectations are organized first by the five strands. Each of the strands is then broken down into content pieces titled "Topics" in an attempt to cluster related ideas for teaching continuity. Under each "Topic" are listed the expectations.

The second format is a "**cross-grade**" version, which has been designed with the intent that one grade level can be easily compared with another and to highlight the mathematical growth that is envisioned across the grades. This format also has been organized into the five strands. However, each strand has been subdivided into broader, more conceptual groupings called "Domains," to allow for cross grade comparison of the expectations. In several of the strands, the "domains" are similar to the "standards" in *Principles and Standards for School Mathematics* from the National Council of Teachers of Mathematics. In the "cross-grade" version, some key expectations are "cross-listed" in grey when they seem especially crucial to the development of another strand. For instance, several strands from the Number and Operations strand are also listed in grey in the Algebra strand.

Although this organization does not include what have typically been called "process" strands, the importance of mathematical process in the development of these proficiencies cannot be underestimated. Embedded within these expectations are emphases on representation, problem solving, and reasoning as appropriate. The importance of making mathematical connections is conveyed through the cross listing. Finally, the process of communication is foundational to all of mathematics learning.

With the cooperation of all those involved in the education of Michigan students, we can enable our young people to attain the highest standards – and thereby open doors for them to have fulfilling and successful lives in a quantitatively and technologically complex future.

THIRD GRADE

In the third grade, students gain proficiency in addition and subtraction of whole numbers, and continue to develop meaning and computational skill in multiplication. This culminates in knowledge of the 10x10 multiplication table. Students are introduced to decimals through money. Work in measurement is closely related to increased emphasis on ideas from geometry including developing meaning for area and perimeter.

NUMBER AND OPERATIONS

Understand and use number notation and place value

N.ME.03.01 Read and write numbers to 10,000 in both numerals and words, and relate them to the quantities they represent, e.g., relate numeral or written word to a display of dots or objects.

N.ME.03.02 Recognize and use expanded notation for numbers using place value to 10,000s place, e.g., 2,517 is 2 thousands, 5 hundreds, 1 ten, and 7 ones; 4 hundreds and 2 ones is 402. Identify the place value of a digit in a number, e.g., in 3,241, 2 is in the hundreds place.

N.ME.03.03 Compare and order numbers up to 10,000.

Count in steps, and understand even and odd numbers

N.ME.03.04 Count orally by 6's, 7's, 8's and 9's starting with 0, making the connection between repeated addition and multiplication.

N.ME.03.05 Know that even numbers end in 0, 2, 4, 6,or 8; name a whole number quantity that can be shared in two equal groups or grouped into pairs with no remainders; recognize even numbers as multiples of 2. Know that odd numbers end in 1, 3, 5, 7, or 9, and work with patterns involving even and odd numbers.

Add and subtract whole numbers

N.FL.03.06 Add and subtract fluently two numbers: up to and including two-digit numbers with regrouping and up to four-digit numbers without regrouping.

N.FL.03.07 Estimate the sum and difference of two numbers with three digits (sums up to 1,000), and judge reasonableness of estimates.

N.FL.03.08 Use mental strategies to fluently add and subtract two-digit numbers.

Multiply and divide whole numbers

N.MR.03.09 Use multiplication and division fact families to understand the inverse relationship of these two operations, e.g., because $3 \times 8 = 24$, we know that $24 \div 8 = 3$ or $24 \div 3 = 8$. Express a multiplication statement as an equivalent division statement.

N.MR.03.10 Recognize situations that can be solved using multiplication and division including finding "How many groups?" and "How many in a group?" and write mathematical statements for those situations.

N.FL.03.11 Find products fluently up to 10×10; find related quotients using multiplication and division relationships.

N.MR.03.12 Find solutions to open sentences such as $7 \times \square = 42$ or $12 \div \square = 4$, using the inverse relationship between multiplication and division.

N.FL.03.13 Mentally calculate simple products and quotients up to a three-digit number by a one-digit number involving multiples of 10, e.g., 500×6, or $400 \div 8$.

N.MR.03.14 Solve simple division problems involving remainders, viewing remainder as the "number left over" (less than the divisor), e.g., 4 children per group; we have 25 children; there are 6 groups with 1 child left over; interpret based on problem context.

Problem-solving with whole numbers

N.MR.03.15 Given problems that use any one of the four operations with appropriate numbers, represent with objects, words (including "product" and "quotient"), and mathematical statements; solve.

Understand simple fractions, relation to the whole, and addition and subtraction of fractions

N.ME.03.16 Understand that fractions may represent a portion of a whole unit that has been partitioned into parts of equal area or length; use the terms "numerator" and "denominator."

N.ME.03.17 Recognize, name and use equivalent fractions with denominators 2, 4, and 8, using strips as area models.

N.ME.03.18 Place fractions with denominators of 2, 4, and 8 on the number line; relate the number line to a ruler; compare and order up to three fractions with denominators 2, 4, and 8.

N.ME.03.19 Understand that any fraction can be written as a sum of unit fractions, e.g., 3/4 = 1/4 + 1/4 + 1/4.

N.MR.03.20 Recognize that addition and subtraction of fractions with equal denominators can be modeled by joining and taking away segments on the number line.

Understand simple decimal fractions in relation to money

N.ME.03.21 Understand the meaning of $0.50 and $0.25 related to money, e.g., $1.00 shared by two people means $1.00 ÷ 2 = 1/2 dollar = $0.50.

MEASUREMENT

Measure and use units for length, weight, temperature and time

M.UN.03.01 Know and use common units of measurements in length, weight and time.

M.UN.03.02 Measure in mixed units within the same measurement system for length, weight and time: feet and inches, meters and centimeters, kilograms and grams, pounds and ounces, liters and milliliters, hours and minutes, minutes and seconds, years and months.

M.UN.03.03 Understand relationships between sizes of standard units, e.g., feet and inches, meters and centimeters.

M.UN.03.04 Know benchmark temperatures such as freezing (32°F, 0°C); boiling, (212°F, 100°C); and compare temperatures to these, e.g., cooler, warmer.

Understand meaning of area and perimeter and apply in problems

M.UN.03.05 Know the definition of area and perimeter and calculate the perimeter of a square and rectangle given whole number side lengths.

M.UN.03.06 Use square units in calculating area by covering the region and counting the number of square units.

M.UN.03.07 Distinguish between units of length and area and choose a unit appropriate in the context.

M.UN.03.08 Visualize and describe the relative sizes of one square inch and one square centimeter.

Estimate perimeter and area

M.TE.03.09 Estimate the perimeter of a square and rectangle in inches and centimeters; estimate the area of a square and rectangle and square inches and square centimeters.

Solve measurement problems

M.PS.03.10 Add and subtract lengths, weights and times using mixed units within the same measurement system.

M.PS.03.11 Add and subtract money in dollars and cents.

M.PS.03.12 Solve applied problems involving money, length and time.

M.PS.03.13 Solve contextual problems about perimeters of rectangles and areas of rectangular regions.

GEOMETRY

Recognize the basic elements of geometric objects

G.GS.03.01 Identify points, line segments, lines and distance.

G.GS.03.02 Identify perpendicular lines and parallel lines in familiar shapes and in the classroom.

G.GS.03.03 Identify parallel faces of rectangular prisms, in familiar shapes and in the classroom.

Name and explore properties of shapes

G.GS.03.04 Identify, describe, compare and classify two-dimensional shapes, e.g., parallelogram, trapezoid, circle, rectangle, square and rhombus, based on their component parts (angles, sides, vertices, line segment) and the number of sides and vertices.

G.SR.03.05 Compose and decompose triangles and rectangles to form other familiar two-dimensional shapes, e.g., form a rectangle using two congruent right triangles, or decompose a parallelogram into a rectangle and two right triangles.

Explore and name three-dimensional solids

G.GS.03.06 Identify, describe, build and classify familiar three-dimensional solids, e.g., cube, rectangular prism, sphere, pyramid, cone, based on their component parts (faces, surfaces, bases, edges, vertices).

G.SR.03.07 Represent front, top, and side views of solids built with cubes.

DATA AND PROBABILITY

Use bar graphs

D.RE.03.01 Read and interpret bar graphs in both horizontal and vertical forms.

D.RE.03.02 Read scales on the axes and identify the maximum, minimum, and range of values in a bar graph.

D.RE.03.03 Solve problems using information in bar graphs including comparison of bar graphs.